Roland

LA SOUND CARD
LAPC-I

Thank you for purchasing the Roland LAPC-I LA Sound Card for installation in IBM or fully IBM-compatible computers. The LAPC-I needs only to be connected to headphones or a stereo amplification system to take full advantage of the sound capabilities of this product.

The LAPC-I Sound Card is an integrated unit combining an LA Process Multi-Timbral Tone Generation, and intelligent MIDI interface.
The tone generation system is functionally equivalent to the Roland MT-32 Multi-Timbral Sound Module and the interface between the computer and the tone generation system is equivalent to the Roland MPU-401 MIDI processing unit.

The LAPC-I conforms to Musical InstrumentDigital Interface (MIDI) standards which define data exchange between electronic musical instruments and devices. MIDI-equipped keyboards, sequencers, or other devices may be connected to the LAPC-I via the MCB-1 MIDI connector box. MIDI input data can be routed to the computer and/or directly to the LAPC-I tone generators and because the LAPC-I recognizes and processes data in the same manner as the MPU-401, you can take full advantage of other music software that is MPU-401 compatible.

For West Germany

Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

MULTI TIMBRAL SOUND MODULE LAPC-I

(Gerat. Typ. Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

Amtsbl. Vfg 1046/1984

(Amtsblattverfügung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Roland Corporation Osaka/Japan

Name des Herstellers/Importeurs

For the USA

RADIO AND TELEVISION INTERFERENCE

WARNING — This equipment has been verified to comply with the limits for a Class B computing device, pursuant to Subpart J, of Part 15, of FCC rules. Operation with non-certified or non-verified equipment is likely to result in interference to radio and TV reception.

The equipment described in this manual generates and uses radio frequency energy. If it is not installed and used properly, that is, in strict accordance with our instructions, it may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J, of Part 15, of FCC Rules. These rules are designed to provide reasonable protection against such a interference in a rasidential installation. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by the following measure:

- Disconnect other devices and their input/output cables one at a time. If the interference stops, it is caused by either the other device or its I/O cable. These devices usually require Roland designated shielded I/O cables. For Roland devices, you can obtain the proper shielded cable from your dealer. For non Roland devices, contact the manufacturer or dealer for assistance.

If your equipment does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures.

- Turn the TV or radio antenna until the interference stops.
- Move the equipment to one side or the other of the TV or radio.
- Move the equipment farther away from the TV or radio.
- Plug the equipment into an outlet that is on a different circuit than the TV or radio. (That is, make certain the equipment and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with coaxial cable lead-in between the antenna and TV. If necessary, you should consult your dealer or an experienced radio/television technician for additional suggestions. You may find helpful the following booklet prepared by the Federal Communications Commission:

"How to Identify and Resolve Radio — TV Interference Problems"

This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4.

For Canada

CLASS B **NOTICE**

This digital apparatus does not exceed the Class B limits for radio noise emissions set out in the Radio Interference Regulations of the Canadian Department of Communications.

CLASSE B **AVIS**

Cet appareil numérique ne dépasse pas les limites de la classe B au niveau des émissions de bruits radioélectriques fixés dans le Réglement des signaux parasites par le ministère canadien des Communications.

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■MINIMUM SYSTEMS REQUIREMENTS

In order to install the LAPC-I LA Sound Card you must have the following equipment:

- ●IBM or fully IBM-compatible computer with at least one full length (13-inch) card slot available.

and to use the LAPC-I you should have:

- ●Stereo headphones (with a mini-plug)
- ●and/or stereo amplification system
- ●MIDI keyboard (optional)
- ●ROLAND MIDI connector box MCB-1 (optional)

■SETUP

The ROLAND LAPC-I LA Sound Card installs in a full length (13-inch) expansion slot in the computer system unit. The procedure is simple and requires only a few tools and the ability to follow directions.

*** Disconnect the computer and peripherals (monitor, printer, etc.) from AC power before attempting to open the cabinet.**

*** Static electricity can damage electronic parts and equipment. Move the computer to an area where static electricity is not a problem.**

The tools required depend on the type of bolts used in your computer. In general, these tools should do the job:

1. small straight slot screwdriver
2. small Phillips (#0) screwdriver
3. 1/4-inch socket driver

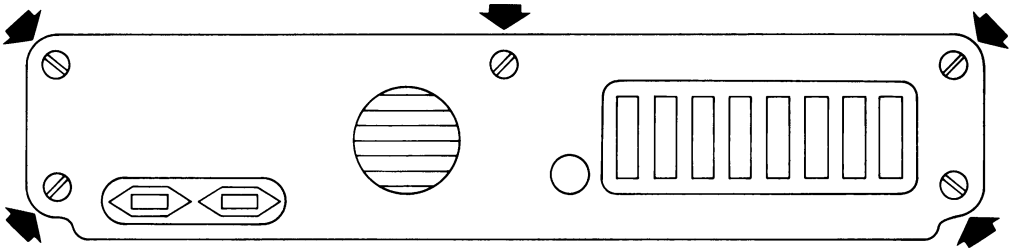
■ *INSTALLATION INSTRUCTIONS*

①Unplug the computer and peripherals from the AC wall outlet.

②Remove any equipment from the top of the computer.

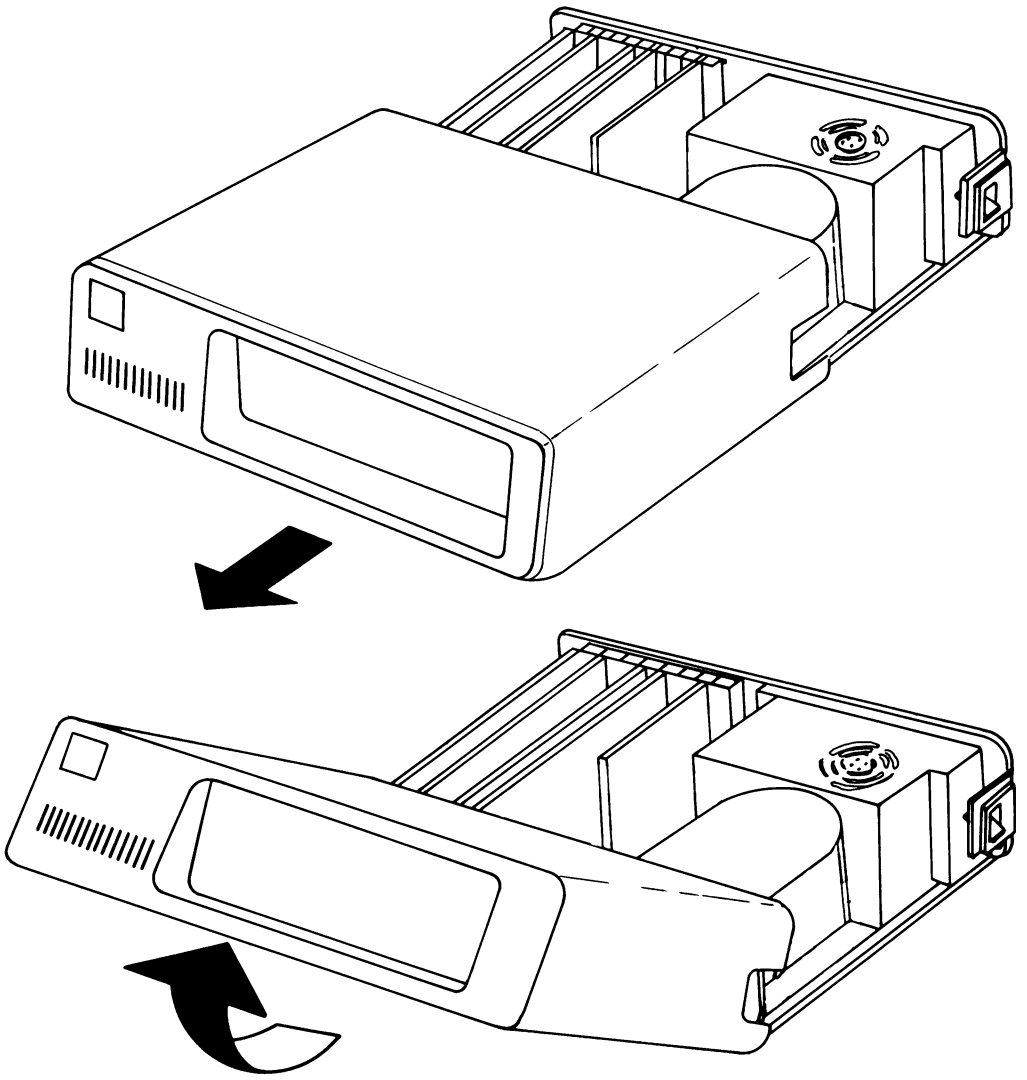
③Remove the five bolts from the rear panel (see Fig. 1).

Fig. 1



Rear Panel Bolt Locations

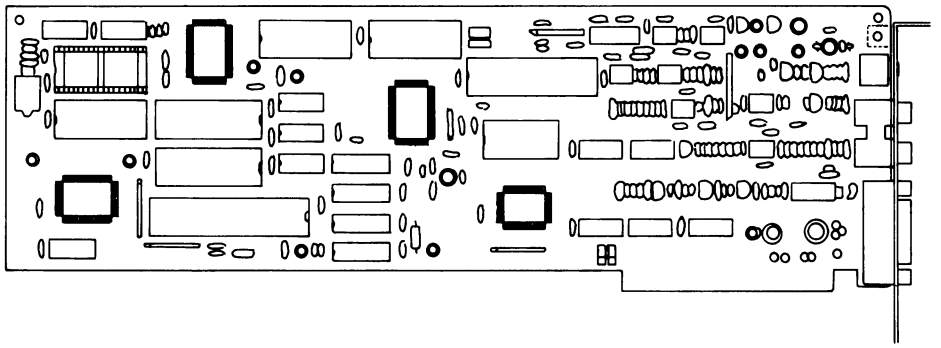
④From the front of the computer, grasp the left and right sides of the cabinet and pull toward you. The cover should slide without too much resistance.



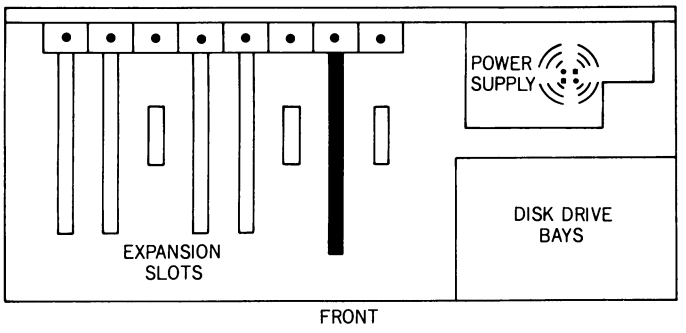
*If the cover doesn't slide, check for snags between the cover and cables.

⑤**Remove a cover plate from an empty full length slot by removing the retaining screw with the Phillips screw driver.**

⑥**Remove the LAPC-I circuit board from its protective wrapping and position it over the expansion slot so that the jacks and connector protrude through the rear opening.**



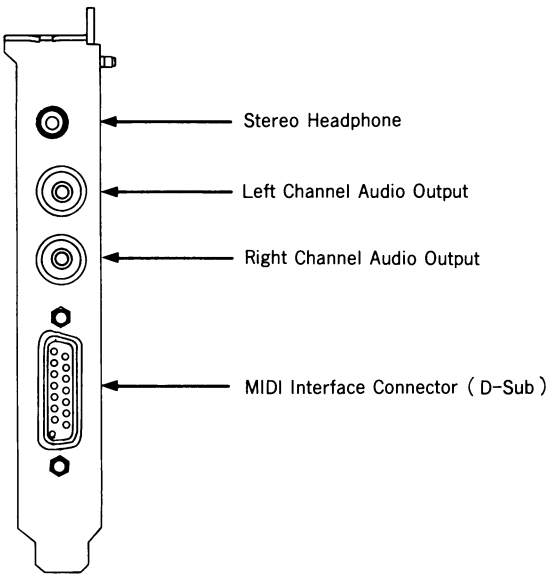
⑦**Align the card edge connector over the connector slot and push the LAPC-I board into the slot. Secure the board into the slot with the retaining screw.**



⑧**Slide the cover onto the cabinet being careful not to snag any cables or wires.**

⑨**Secure the cover in place by installing the five bolts (refer to Fig.1).**

⑩**Connect headphones to the headphone jack and/or a stereo amplifier (aux inputs) to the audio output jacks of the LAPC-I board.**



⑪**Connect the MIDI connector box MCB-1 to the MIDI interface Connector. This box provides the connectors for attaching MIDI equipped keyboards and other devices to the LAPC-I card. This box also contains a metronome beeper.**

■ *USING THE LAPC-I LA SOUND CARD*

●Basic Operation

LAPC-I board controlled by computer :

①Turn on your computer.

②Start software.

③Turn on your stereo system. Make sure the volume control of your stereo is turned low.

④Select the AUX input source on your stereo.

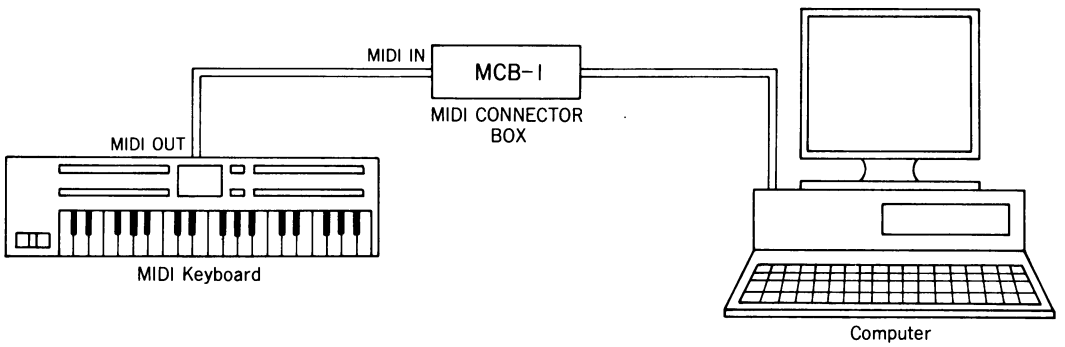
⑤Adjust the volume to a comfortable listening level.

●MIDI Keyboard Input

Permits LAPC-I tone generators to be keyed from external keyboard and allows recording of external keyboard input.

①Complete the Basic Operation procedures above.

②Connect the MIDI Keyboard MIDI OUT to the MIDI connector box MCB-1 MIDI IN connector.



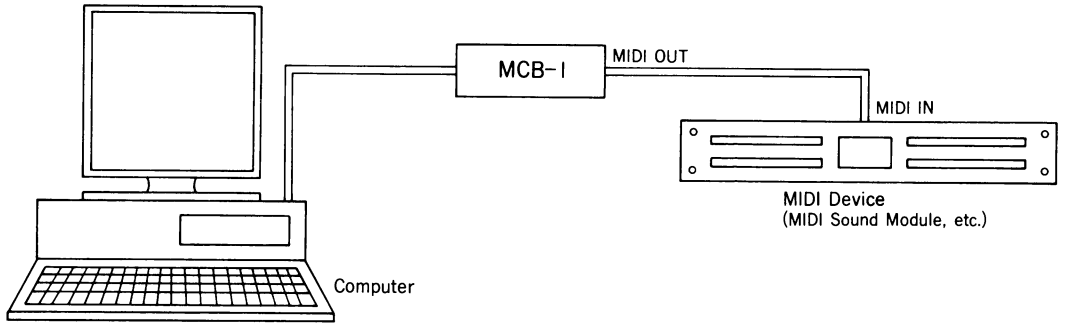
* The sound source in the LAPC-I can be sounded even without using software, if an external keyboard is used for performance. When software is to be used, set THRU in the MIDI interface section to "ON" by means of the software. When THRU is not ON, performance information originating from the computer will generate sound, but an external keyboard will not produce sound. For details, refer to the manual for the software used.

●MIDI Data Output

Sends MIDI data to the LAPC-I tone generators and to an external MIDI device.

①Complete the Basic Operation procedures above.

②Connect MIDI OUT of the MIDI connector box MCB-1 to MIDI IN of the MIDI device.



■OVERVIEW OF THE MULTI-TIMBRAL SOUND SOURCE

Within the LAPC-I are contained 8 separate sound generating Parts, and a rhythm Part(includes sound effects). Upon power-up, each Part is set as follows.

Default Settings at Power-up

Part	Sound(Number of Partials)	Partial Reserve	pan	MIDI Ch
1	Slap Bass 1 (3)	3	><	2
2	Str Sect 1 (4)	10	><	3
3	Brs Sect 1 (4)	6	><	4
4	Sax 1 (4)	4	><	5
5	Ice Rain (3)	3	<4	6
6	Elec Piano 1 (3)	0	4>	7
7	Bottleblow (4)	0	<7	8
8	Orche Hit (4)	0	7>	9
Rhythm	———	6	——	10

●Sounds

The following sounds can be used for each Part. The Patches for each Part can be changed at will using Program Change messages.

Part 1-8	From among the 128 types of sound(patches) available. 1 can be chosen for each Part
Rhythm part	Note numbers 35-75 :Rhythm sounds Note numbers 76-108 :Sound effects

●Maximum simultaneous voices

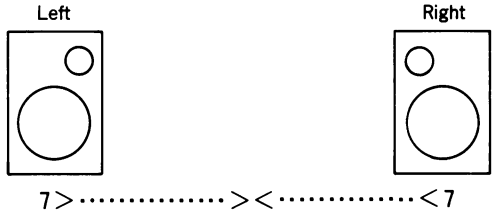
For all Parts combined, the maximum number of voices that can be simultaneousty produced is 32. However, this number may vary depending on the particular combinations of sound being produced . An individual sound can be composed of up to 4 Partials. A Partial is the most fundamental unit making up a sound to be generated. For information on the number of Partials used in each sound, refer to the Sound List.

●Partial Reserve

Partial Reserve is a feature that makes sure each Part has the minimum required number of Partial reserved for it. When note information requiring in excess of 32 voices is received, the amount of partials set under partial reserve for each part are held for use. Parts should be selected after carefully considering how they will actually be used.

●Pan

When using the LAPC-I for stereo output, Pan allows you to set the orientation of the stereo sound image. This setting can be made respective to each Part for Parts 1-8, and each rhythm sound in the Rhythm Part.



■ *SOUND EFFECTS ASSIGNMENTS*

Following is a list of the sound effects contained in the LAPC-I with the note number assigned to each voice. These effects are assigned to MIDI channel 10.

* The top octave of sound effects are in an octave above a typical 61 note keyboard. Therefore, it may be necessary to transpose the keyboard up one octave to access sound effects notes 97 and above.

Sound Effects	Note number
Bubble	108
Stream	107
Waves	106
Wind	105
Thunder	104
Rain	103
Birds	102
Horse	101
Dog	100
Explosion	99
Lasergun	98
Machinegun	97
Pistol	96
Starship	95
Helicopter	94
Jet	93
Train	92
Siren	91
Crash	90
Car-pass	89
Car-stop	88
Engine	87
Windchime	86
Scratch	85
Door	84
Cleaking	83
Applause	82
Footsteps 2	81
Footsteps 1	80
Heartbeat	79
punch	78
Screaming	77
Laughing	76

■ *RHYTHM ASSIGNMENTS*

Following is a list of rhythm sounds contained in the LAPC-I with the note number assigned to each voice. These voices are accessible on MIDI channel 10.

Rhythm tone	Note number
Claves	75
	74
Quijada	73
Smba Whis L	72
Smba Whis S	71
Maracas	70
Cabasa	69
Low Agogo	68
High Agogo	67
Low Timbale	66
High Timbale	65
Low Conga	64
High Conga	63
Mt High Conga	62
Low Bongo	61
High Bongo	60
	59
	58
	57
Cowbell	56
	55
Tambourine	54
	53
	52
Ride Cym	51
Acou Hi Tom	50
Crash Cym	49
Acou Hi Tom	48
Acou Mid Tom	47
Open Hi Hat 1	46
Acou Mid Tom	45
Open Hi Hat 2	44
Acou Low Tom	43
Clsd Hi Hat	42
Acou Low Tom	41
Elec SD	40
Hand Clap	39
Acou SD	38
Rim Shot	37
Acou BD	36
Acou BD	35

■ *USING TAPE SYNCRONIZATION*

Tape Sync : Permits the operation of the LAPC-I to syncronize or be syncronized to a multi-track tape recorder.

1. Complete the Basic Operation procedures above.

2. To record a tape sync track :

①Connect TAPE OUT on the MIDI connector box MCB-1 to the sync track input on a multi-track tape recorder.

②Adjust the record level for zero VU (use the meter on the tape recorder).

③Start the tape recorder.

④Wait a few seconds then begin RECORDing or PLAYback.

⑤When recording or playback has been completed, wait a few seconds then stop the tape recorder.

3. To sync to a previously recorded tape sync track :

①Connect the tape recorder tape sync output to TAPE IN on the MIDI connector box MCB-1.

②Start playback of the tape sync track on the tape recorder. Playback or recording will begin automatically when a tape sync start pulse is received.

■ *ACCESSING THE TONE GENERATORS DIRECTLY*

When the computer is first turned on, the MIDI interface on the LAPC-I card is in the THRU mode. If you have a MIDI keyboard controller such as the Roland A-50 (or similar) connected to the LAPC-I card, you can play the tone generators without having to load software.

■ *SPECIFICATIONS*

Terminal :

AUDIO OUT L ·····1
R ·····1
PHONES ·····1
D-Sub ·····1

Dimensions :

350(W)×126(D)×22(H)mm
13-25/32"×4-31/32"×7/8"

Current consumptions :

+5V/550 mA
−5V/50mA

Weight :

300g/11 oz

Accessories :

Connecting cord (2 pcs.)
Owner's Manual

Roland Exclusive Messages

1 Data Format for Exclusive Messages

Roland's MIDI implementation uses the following data format for all exclusive messages (type IV) :

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
CMD	Command ID
[BODY]	Main data
F7H	End of exclusive

MIDI status : F0H, F7H

An exclusive message must be flanked by a pair of status codes, starting with a Manufacturer - ID immediately after F0H (MIDI version1.0).

Manufacturer - ID : 41H

The Manufacturer - ID identifies the manufacturer of a MIDI instrument that triggers an exclusive message. Value 41H represents Roland's Manufacturer - ID.

Device - ID : DEV

The Device - ID contains a unique value that identifies the individual device in the multiple implementation of MIDI instruments. It is usually set to 00H - 0FH, a value smaller by one than that of a basic channel, but value 00H - 1FH may be used for a device with multiple basic channels.

Model - ID : MDL

The Model - ID contains a value that uniquely identifies one model from another. Different models, however, may share an identical Model - ID if they handle similar data.

The Model - ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Model - IDs, each representing a unique model :

01H
02H
03H
00H, 01H
00H, 02H
00H, 00H, 01H

Command - ID : CMD

The Command - ID indicates the function of an exclusive message. The Command - ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Command - IDs, each representing a unique function :

01H
02H
03H
00H, 01H
00H, 02H
00H, 00H, 01H

Main data : BODY

This field contains a message to be exchanged across an interface. The exact data size and contents will vary with the Model - ID and Command - ID.

2 Address - mapped Data Transfer

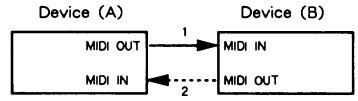
Address mapping is a technique for transferring messages conforming to the data format given in Section 1. It assigns a series of memory - resident records - - waveform and tone data, switch status, and parameters, for example - - to specific locations in a machine - dependent address space, thereby allowing access to data residing at the address a message specifies.

Address - mapped data transfer is therefore independent of models and data categories. This technique allows use of two different transfer procedures : one - way transfer and handshake transfer.

One - way transfer procedure (See Section 3 for details.)

This procedure is suited for the transfer of a small amount of data. It sends out an exclusive message completely independent of a receiving device status.

Connection Diagram

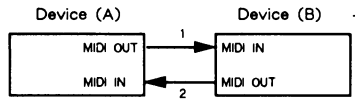


Connection at point 2 is essential for "Request data" procedures. (See Section 3.)

Handshake - transfer procedure (See Section 4 for details.)

This procedure initiates a predetermined transfer sequence (handshaking) across the interface before data transfer takes place. Handshaking ensures that reliability and transfer speed are high enough to handle a large amount of data.

Connection Diagram



Connection at points 1 and 2 is essential.

Notes on the above two procedures

* There are separate Command - IDs for different transfer procedures.
* Devices A and B cannot exchange data unless they use the same transfer procedure, share identical Device - ID and Model ID, and are ready for communication.

3 One - way Transfer Procedure

This procedure sends out data all the way until it stops and is used when the messages are so short that answerbacks need not be checked.
For long messages, however, the receiving device must acquire each message in time with the transfer sequence, which inserts intervals of at least 20 milliseconds in between.

Types of Messages

Message	Command ID
Request data 1	RQ1 (11H)
Data set 1	DT1 (12H)

Request data # 1 : RQ1 (11H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.
On receiving an RQ1 message, the remote device checks its memory for the data address and size that satisfy the request.

If it finds them and is ready for communication, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device will send out nothing.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
11H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ssH	Size MSB
⋮	⋮
	LSB
sum	Check sum
F7H	End of exclusive

*The size of the requested data does not indicate the number of bytes that will make up a DT1 message, but represents the address fields where the requested data resides.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model - ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Data set 1 : DT1 (12H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, a DT1 message can convey the starting address of one or more data as well as a series of data formatted in an address - dependent order.

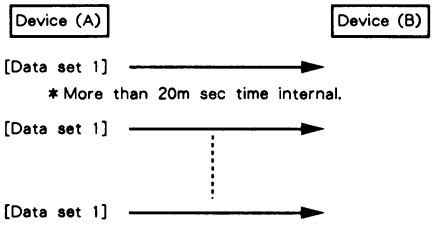
The MIDI standards inhibit non - real time messages from interrupting an exclusive one. This fact is inconvenient for the devices that support a "soft - through" mechanism. To maintain compatibility with such devices, Roland has limited the DT1 to 256 bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
12H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

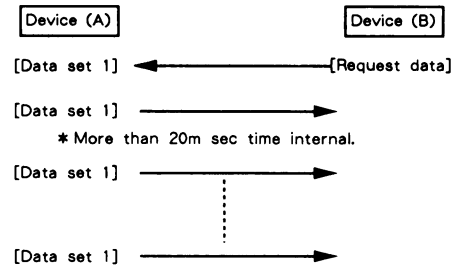
*A DT1 message is capable of providing only the valid data among those specified by an RQ1 message.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The number of bytes comprising address data varies from one Model - ID to another.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Example of Message Transactions

● Device A sending data to Device B
Transfer of a DT1 message is all that takes place.



● Device B requesting data from Device A
Device B sends an RQ1 message to Device A. Checking the message, Device A sends a DT1 message back to Device B.



4 Handshake - Transfer Procedure

Handshaking is an interactive process where two devices exchange error checking signals before a message transaction takes place, thereby increasing data reliability. Unlike one - way transfer that inserts a pause between message transactions, handshake transfer allows much speedier transactions because data transfer starts once the receiving device returns a ready signal.

When it comes to handling large amounts of data - - sampler waveforms and synthesizer tones over the entire range, for example - - across a MIDI interface, handshaking transfer is more efficient than one - way transfer.

Types of Messages

Message	Command ID
Want to send data	WSD (40H)
Request data	RQD (41H)
Data set	DAT (42H)
Acknowledge	ACK (43H)
End of data	EOD (45H)
Communication error	ERR (4EH)
Rejection	RJC (4FH)

Want to send data : WSD (40H)

This message is sent out when data must be sent to a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of the data to be sent.

On receiving a WSD message, the remote device checks its memory for the specified data address and size which will satisfy the request. If it finds them and is ready for communication, the device will return an "Acknowledge (ACK)" message.
Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
40H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ssH	Size MSB
⋮	⋮
	LSB
sum	Check sum
F7H	End of exclusive

*The size of the data to be sent does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the data should reside.
*Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
*The same number of bytes comprises address and size data, which, however, vary with the Model - ID.
*The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Request data : RQD (41H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.

On receiving an RQD message, the remote device checks its memory for the data address and size which satisfy the request. If it finds them and is ready for communication, the device will transmit a "Data set (DAT)" message, which contains the requested data. Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
41H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ssH	Size MSB
⋮	⋮
	LSB
sum	Check sum
F7H	End of exclusive

* The size of the requested data does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the requested data resides.
* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
* The same number of bytes comprises address and size data, which, however, vary with the Model – ID.
* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Data set : DAT (42H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, the message can convey the starting address of one or more data as well as a series of data formatted in an address – dependent order.

Although the MIDI standards inhibit non – real time messages from interrupting an exclusive one, some devices support a "soft – through" mechanism for such interrupts. To maintain compatibility with such devices, Roland has limited the DAT to 256 bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
42H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

* A DAT message is capable of providing only the valid data among those specified by an RQD or WSD message.
* Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
* The number of bytes comprising address data varies from one model ID to another.
* The error checking process uses a checksum that provides a bit pattern where the least significant 7 bits are zero when values for an address, size, and that checksum are summed.

Acknowledge : ACK (43H)

This message is sent out when no error was detected on reception of a WSD, DAT, "End of data (EOD)", or some other message and a requested setup or action is complete. Unless it receives an ACK message, the device at the other end will not proceed to the next operation.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
43H	Command ID
F7H	End of exclusive

End of data : EOD (45H)

This message is sent out to inform a remote device of the end of a message. Communication, however, will not come to an end unless the remote device returns an ACK message even though an EOD message was transmitted.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
45H	Command ID
F7H	End of exclusive

Communications error : ERR (4EH)

This message warns the remote device of a communications fault encountered during message transmission due, for example, to a checksum error. An ERR message may be replaced with a "Rejection (RJC)" one, which terminates the current message transaction in midstream.

When it receives an ERR message, the sending device may either attempt to send out the last message a second time or terminate communication by sending out an RJC message.

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
4EH	Command ID
F7H	End of exclusive

Rejection : RJC (4FH)

This message is sent out when there is a need to terminate communication by overriding the current message. An RJC message will be triggered when :

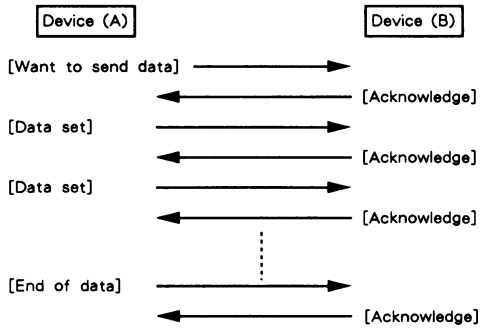
- a WSD or RQD message has specified an illegal data address or size.
- the device is not ready for communication.
- an illegal number of addresses or data has been detected.
- data transfer has been terminated by an operator.
- a communications error has occurred.

An ERR message may be sent out by a device on either side of the interface. Communication must be terminated immediately when either side triggers an ERR message.

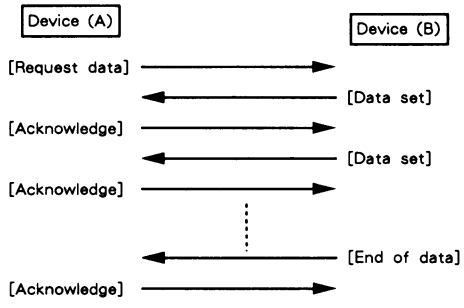
Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
4FH	Command ID
F7H	End of exclusive

Example of Message Transactions

●Data transfer from device (A) to device (B).

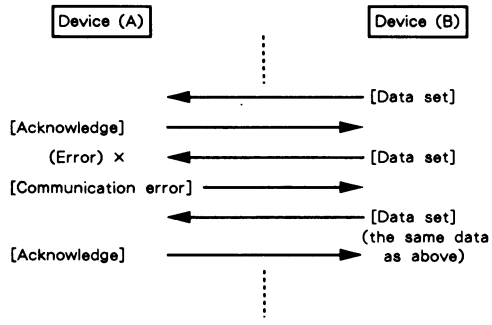


●Device (A) requests and receives data from device (B).

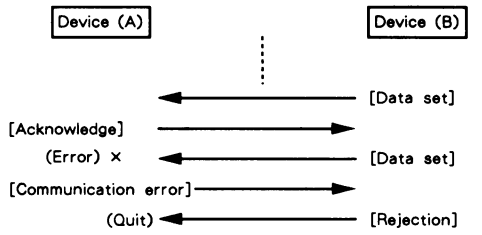


●Error occurs while device (A) is receiving data from device (B).

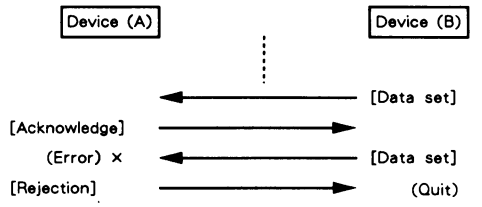
1) Data transfer from device (A) to device (B).



2) Device (B) rejects the data re – transmitied, and quits data transfer.



3) Device (A) immediately quits data transfer.



LA SOUND CARD (Tone Generation System Part) Date : Mar. 30. 1989

Model LAPC－I

MIDI Implementation

Version : 1.00

1. RECOGNIZED RECEIVE DATA (Parts 1 - 8)

■Note event

●Note off

Status	Second	Third
8nH	kkH	vvH
9nH	kkH	00H

kk = note number 00H - 7FH (0 - 127)
vv = velocity ignored
n = MIDI Channel 0H - FH (1 - 16)

A tone whose envelope mode is "NO SUS" ignores Note off message.

●Note on

Status	Second	Third
9nH	kkH	vvH

kk = note number 00H - 7FH (0 - 127)
vv = velocity 01H - 7FH (1 - 127)
n = MIDI Channel 0H - FH (1 - 16)

Note numbers outside of the range 12 - 108 are transposed to the nearest octave inside the range.

■Control change

●Modulation Depth

Status	Second	Third
BnH	01H	vvH

vv = Modulation depth 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

●Data Entry

Status	Second	Third
BnH	06H	vvH

vv = Value of a parameter specified by RPN.(See description in RPN MSB.)
n = MIDI Channel 0H - FH (1 - 16)

●Main Volume

Status	Second	Third
BnH	07H	vvH

vv = Volume Value 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

Controls the volume of a Part accessible through the received MIDI channel.
The maximum volume is determined by Master volume and Expression message.

●Panpot

Status	Second	Third
BnH	0AH	vvH

vv = Panpot Value 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

Orientation of sound is as follows.

127 = LEFT, 64 = CENTER, 0 = RIGHT

●Expression

Status	Second	Third
BnH	0BH	vvH

vv = Expression 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

Controls the volume of a Part accessible through the received MIDI channel.
The maximum volume is determined by Master volume and Main Volume message.

●Hold - 1

Status	Second	Third
BnH	40H	vvH

vv = 00H - 3FH : off
vv = 40H - 7FH : on
n = MIDI Channel 0H - FH (1 - 16)

●RPN LSB

Status	Second	Third
BnH	64H	vvH

vv = The lower byte of a parameter number controlled by RPN.(Refer to RPN MSB.)
n = MIDI Channel 0H - FH (1 - 16)

●RPN MSB

Status	Second	Third
BnH	65H	vvH

vv = The upper byte of a parameter number controlled by RPN.
n = MIDI Channel 0H - FH (1 - 16)

Using MIDI RPN, LAPC - I parameters can be controlled by Control change message. RPN MSB and LSB specify the parameter to be controlled while Data entry sets the parameter value.
Effective RPN to LAPC - I is Bender range.

RPN MSB	RPN LSB	Data Entry	Description
00H	00H	vvH	Bender Range vv = 0 - 24 Unit in semitone, 2 octaves maximum

●Resets All Controllers

Status	Second	Third
BnH	79H	00H

n = MIDI Channel 0H - FH (1 - 16)

Sets eatch of the following controls as follows.

Controller	setting
Modulation Depth	OFF (0)
Expression	MAX (127)
Hold 1	OFF (0)
Pitch Bender Change	CENTER

■Program change

Status	Second
CnH	ppH

pp = Patch Number 0H - 7FH (1 - 128)
n = MIDI Channel 0H - FH (1 - 16)

Program change information is used to change Patches.

■Pitch Bender change

Status	Second	Third
EnH	llH	mmH

ll = Pitch Bender change value (Lower byte) 00H - 7FH (0 - 127)
mm = Pitch Bender change value (Upper byte) 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

■Mode message

●All notes off

Status	Second	Third
BnH	7BH	00H

n = MIDI Channel 0H - FH (1 - 16)

Turns off all notes that have been turned on by MIDI Note on.

●OMNI OFF

Status	Second	Third
BnH	7CH	00H

n = MIDI Channel 0H - FH (1 - 16)

Recognized as only All notes off.
LAPC - I remains in mode 3 (omni off, poly).

●OMNI ON

Status	Second	Third
BnH	7DH	00H

n = MIDI Channel 0H - FH (1 - 16)

Recognized as only All notes off.
LAPC - I remains in mode 3 (omni off, poly).

●MONO

Status	Second	Third
BnH	7EH	00H

n = MIDI Channel 0H - FH (1 - 16)

Recognized as only All notes off.
LAPC - I remains in mode 3 (omni off, poly).

●POLY

Status	Second	Third
BnH	7FH	00H

n = MIDI Channel 0H - FH (1 - 16)

Recognized as only All notes off.
LAPC - I remains in mode 3 (omni off, poly).

■Exclusive

Status	
F0H	: System Exclusive
F7H	: EOX (End Of Exclusive)

Using exclusive message, a set of parameters for a timbre or individual parameters in a patch or timbre can be transferred to LAPC - I.
Refer to Roland Exclusive Messages and Sections 3 and 4.

2. RECOGNIZED REDEIVE DATA (Rhythm Part)

Messages on MIDI channels not assigned to rhythm part are ignored.

■Note event

●Note off

Status	Second	Third
8nH	kkH	vvH
9nH	kkH	00H

kk = note number 18H - 6CH (24 - 108)
vv = velocity ignored
n = MIDI Channel 0H - FH (1 - 16)

A tone whose envelope mode is "NO SUS" ignores Note off message.

●Note on

Status	Second	Third
9nH	kkH	vvH

kk = note number 18H - 6CH (24 - 108)
vv = velocity 01H - 7FH (1 - 127)
n = MIDI Channel 0H - FH (1 - 16)

Note numbers outside of the range 24 - 108 are ignored.

■Control change

●Modulation Depth

Status	Second	Third
BnH	01H	vvH

vv = Modulation depth 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

●Data Entry

Status	Second	Third
BnH	06H	vvH

vv = Value of a parameter specified by RPN.(See description in RPN MSB.)
n = MIDI Channel 0H - FH (1 - 16)

●Main Volume

Status	Second	Third
BnH	07H	vvH

vv = Volume Value 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

Can control the volume of the rhythm part.
The maximum volume is determined by Master volume and Expression message.

●Expression

Status	Second	Third
BnH	0BH	vvH

vv = Expression 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

Controls the volume of a Part accessible through the received MIDI channel.
The maximum volume is determined by Master volume and Main Volume message.

●Hold - 1

Status	Second	Third
BnH	40H	vvH

vv = 00H - 3FH : off
vv = 40H - 7FH : on
n = MIDI Channel 0H - FH (1 - 16)

● RPN LSB

Status	Second	Third
BnH	64H	vvH

vv = The lower byte of a parameter number controlled by RPN. (Refer to RPN MSB.)
n = MIDI Channel 0H - FH (1 - 16)

● RPN MSB

Status	Second	Third
BnH	65H	vvH

vv = The upper byte of a parameter number controlled by RPN.
n = MIDI Channel 0H - FH (1 - 16)

MSB and LSB RPN together specifies parameter to be controlled while Data entry determines the value.
Effective RPN on LAPC - I is Bender range.

RPN MSB	RPN LSB	Data Entry	Description
00H	00H	vvH	Bender Range vv = 0 - 24 Unit in semitone, 2 octaves maximum

● Resets All Controllers

Status	Second	Third
BnH	79H	00H

n = MIDI Channel 0H - FH (1 - 16)

Sets controllers to the value as shown below.

Controller	setting
Modulation Depth	OFF (0)
Expression	MAX (127)
Hold 1	OFF (0)
Pitch Bender Change	CENTER

■Pitch Bender change

Status	Second	Third
EnH	llH	mmH

ll = Pitch Bender change value (Lower byte) 00H - 7FH (0 - 127)
mm = Pitch Bender change value (Upper byte) 00H - 7FH (0 - 127)
n = MIDI Channel 0H - FH (1 - 16)

■Exclusive

Status	
F0H	: System Exclusive
F7H	: EOX (End Of Exclusive)

Using exclusive message, a set of parameters for a individual parameters in a rhythm part can be transferred to LAPC - I.
Refer to Roland Exclusive Messages and Sections 3 and 4.

3. EXCLUSIVE COMMUNICATION

Parameters for patches or timbres can be transferred to LAPC - I through Exclusive message.
Model - ID # of LAPC - I is 16H.
In a system where more than one MIDI channel is assigned to LAPC - I,Unit # may be set to the LAPC - I instead of Device - ID # of a basic channel.
The advantage of Unit # is that a specific part is made accessible independent of MIDI channel of that part.
Whether to use MIDI channel or Unit # depends on parameter address.
LAPC - I recognizes MIDI channels 1 thru 16 and Unit # 17 as Device - ID #.
Note that the actual Device - ID # is the number 1 less MIDI channel number or Unit #.

■One way communication

Data set 1 DT1 12H

Byte	Description	
F0H	Exclusive status	
41H	Manufacturer's ID (Roland)	
DEV	Device ID	
16H	Model ID	
12H	Command ID (DT1)	
aaH	Address MSB	* 3 - 1
aaH	Address	
aaH	Address LSB	
ddH	Data	* 3 - 2
:	:	
sum	Check sum	
F7H	EOX (End Of Exclusive)	

*3 - 1 Address and Address size must cover the memory location where data exist.

*3 - 2 When comming data are for partial reserve of the system parameter,LAPC - I will make these reserves effective only after receiving all the data.

4. PARAMETER ADDRESS MAP

Addresses are represented in 7 - bit hexadecimal.

Address	MSB		LSB
Binary	0aaa aaaa	0bbb bbbb	0ccc cccc
7 - bit Hexadecimal	AA	BB	CC

The actual address of a parameter is a sum of the start address of each block and one or more offset address.

*4 - 1 Start address plus two offset addresses
(in tables *4 - 1 and *4 - 1 - 1 (*4 - 1 - 2))
*4 - 2 Start address plus one offset address
(in tables *4 - 2)
*4 - 3 Start address plus two offset addresses
(in tables *4 - 3 and *4 - 3 - 1)
*4 - 4 - *4 - 6 Start address plus one offset address
(in tables *4 - 4 - *4 - 6)

■Parameter base address

Temporary area (Accessed through each basic channel)

Start address	Description	
02 00 00	Timbre Temporary Area (part 1 - 8)	*4-1

Whole part (Accessible on UNIT #)

Start address	Description	
03 00 00	Patch Temporary Area (part 1)	*4-2
03 00 10	Patch Temporary Area (part 2)	
:	:	
03 00 60	Patch Temporary Area (part 7)	
03 00 70	Patch Temporary Area (part 8)	
03 01 00	Patch Temporary Area (rhythm part)	
03 01 10	Rhythm Setup Temporary Area	*4-3

04 00 00	Timbre Temporary Area (part 1)		*4-1
04 01 76	Timbre Temporary Area (part 2)		
:	:		
04 0B 44	Timbre Temporary Area (part 7)		
04 0D 3A	Timbre Temporary Area (part 8)		
05 00 00	Patch Memory #1		*4-4
05 00 08	Patch Memory #2		
:	:		
05 07 70	Patch Memory #127		
05 07 78	Patch Memory #128		
08 00 00	Timbre Memory #1		*4-1
08 02 00	Timbre Memory #2		
:	:		
08 7C 00	Timbre Memory #63		
08 7E 00	Timbre Memory #64		
10 00 00	System area		*4-5
40 00 00	Write Request		*4-6
7F xx xx	All parameter reset		*4-7

Notes :

*4-1 Timbre Temporary area / Timbre Memory

Offset address	Description		
00 00 00	Common parameter		*4-1-1
00 00 0E	Partial parameter (for Partial# 1)		*4-1-2
00 00 48	Partial parameter (for Partial# 2)		
00 01 02	Partial parameter (for Partial# 3)		
00 01 3C	Partial parameter (for Partial# 4)		

*4-1-1 Common Parameter

Offset address		Description	
00	0aaa aaaa	TIMBRE NAME 1	32 - 127 (ASCII)
:	:	:	
09	0aaa aaaa	TIMBRE NAME 10	
0A	0000 aaaa	Structure of Partial# 1 & 2	0 - 12 (1 - 13)
0B	0000 aaaa	Structure of Partial# 3 & 4	0 - 12 (1 - 13)
0C	0000 aaaa	PARTIAL MUTE	0 - 15 (0000 - 1111)
0D	0000 000a	ENV MODE	0 - 1 (Normal, No sustain)
Total size	00 00 0E		

*4-1-2 Partial Parameter

Offset address		Description	
00 00	0aaa aaaa	WG PITCH COARSE	0 - 96 (C1, C#1, - C9)
00 01	0aaa aaaa	WG PITCH FINE	0 - 100 (-50 - +50)
00 02	0000 aaaa	WG PITCH KEYFOLLOW	0 - 16 (-1, -1/2, -1/4, 0, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 5/4, 3/2, 2, s1, s2)
00 03	0000 000a	WG PITCH BENDER SW	0 - 1 (OFF, ON)
00 04	0000 00aa	WG WAVEFORM/PCM BANK	0 - 3 (SQU/1, SAW/1, SQU/2, SAW/2)
00 05	0aaa aaaa	WG PCM WAVE #	0 - 127 (1 - 128)
00 06	0aaa aaaa	WG PULSE WIDTH	0 - 100
00 07	0000 aaaa	WG PW VELO SENS	0 - 14 (-7 - +7)
00 08	0000 aaaa	P-ENV DEPTH	0 - 10
00 09	0aaa aaaa	P-ENV VELO SENS	0 - 100
00 0A	0000 0aaa	P-ENV TIME KEYF	0 - 4
00 0B	0aaa aaaa	P-ENV TIME 1	0 - 100
00 0C	0aaa aaaa	P-ENV TIME 2	0 - 100
00 0D	0aaa aaaa	P-ENV TIME 3	0 - 100
00 0E	0aaa aaaa	P-ENV TIME 4	0 - 100
00 0F	0aaa aaaa	P-ENV LEVEL 0	0 - 100 (-50 - +50)
00 10	0aaa aaaa	P-ENV LEVEL 1	0 - 100 (-50 - +50)
00 11	0aaa aaaa	P-ENV LEVEL 2	0 - 100 (-50 - +50)
00 12	0aaa aaaa	P-ENV SUSTAIN LEVEL	0 - 100 (-50 - +50)
00 13	0aaa aaaa	END LEVEL	0 - 100 (-50 - +50)
00 14	0aaa aaaa	P-LFO RATE	0 - 100
00 15	0aaa aaaa	P-LFO DEPTH	0 - 100
00 16	0aaa aaaa	P-LFO MOD SENS	0 - 100
00 17	0aaa aaaa	TVF CUTOFF FREQ	0 - 100
00 18	000a aaaa	TVF RESONANCE	0 - 30
00 19	0000 aaaa	TVF KEYFOLLOW	0 - 14 (-1, -1/2, -1/4, 0, 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 5/4, 3/2, 2)
00 1A	0aaa aaaa	TVF BIAS POINT/DIR	0 - 127 (<1A - <7C >1A - >7C)
00 1B	0000 aaaa	TVF BIAS LEVEL	0 - 14 (-7 - +7)
00 1C	0aaa aaaa	TVF ENV DEPTH	0 - 100
00 1D	0aaa aaaa	TVF ENV VELO SENS	0 - 100
00 1E	0000 0aaa	TVF ENV DEPTH KEYF	0 - 4
00 1F	0000 0aaa	TVF ENV TIME KEYF	0 - 4
00 20	0aaa aaaa	TVF ENV TIME 1	0 - 100
00 21	0aaa aaaa	TVF ENV TIME 2	0 - 100
00 22	0aaa aaaa	TVF ENV TIME 3	0 - 100
00 23	0aaa aaaa	TVF ENV TIME 4	0 - 100
00 24	0aaa aaaa	TVF ENV TIME 5	0 - 100
00 25	0aaa aaaa	TVF ENV LEVEL 1	0 - 100
00 26	0aaa aaaa	TVF ENV LEVEL 2	0 - 100
00 27	0aaa aaaa	TVF ENV LEVEL 3	0 - 100
00 28	0aaa aaaa	TVF ENV SUSTAIN LEVEL	0 - 100
00 29	0aaa aaaa	TVA LEVEL	0 - 100
00 2A	0aaa aaaa	TVA VELO SENS	0 - 100 (-50 - +50)
00 2B	0aaa aaaa	TVA BIAS POINT 1	0 - 127 (<1A - <7C >1A - >7C)
00 2C	0000 aaaa	TVA BIAS LEVEL 1	0 - 12 (-12 - 0)
00 2D	0aaa aaaa	TVA BIAS POINT 2	0 - 127 (<1A - <7C >1A - >7C)
00 2E	0000 aaaa	TVA BIAS LEVEL 2	0 - 12 (-12 - 0)
00 2F	0000 0aaa	TVA ENV TIME KEYF	0 - 4
00 30	0000 0aaa	TVA ENV TIME V_FOLLOW	0 - 4
00 31	0aaa aaaa	TVA ENV TIME 1	0 - 100
00 32	0aaa aaaa	TVA ENV TIME 2	0 - 100
00 33	0aaa aaaa	TVA ENV TIME 3	0 - 100
00 34	0aaa aaaa	TVA ENV TIME 4	0 - 100
00 35	0aaa aaaa	TVA ENV TIME 5	0 - 100
00 36	0aaa aaaa	TVA ENV LEVEL 1	0 - 100
00 37	0aaa aaaa	TVA ENV LEVEL 2	0 - 100
00 38	0aaa aaaa	TVA ENV LEVEL 3	0 - 100
00 39	0aaa aaaa	TVA ENV SUSTAIN LEVEL	0 - 100
Total size	00 00 3A		

*4-2 Patch temporary area

Offset address		Description		
00 00	0000 00aa	TIMBRE GROUP	0 - 3 (a, b, i, r)	*4-2-1
00 01	00aa aaaa	TIMBRE NUMBER	0 - 63 (1 - 64)	*4-2-1
00 02	00aa aaaa	KEY SHIFT	0 - 48 (-24 - +24)	*4-2-1
00 03	0aaa aaaa	FINE TUNE	0 - 100 (-50 - +50)	
00 04	000a aaaa	BENDER RANGE	0 - 24	*4-2-1
00 05	0000 00aa	ASSIGN MODE	0 - 3 (POLY 1, POLY 2, POLY 3, POLY 4)	
00 06	0000 000a	REVERB SWITCH	0 - 1 (OFF, ON)	*4-2-1
00 07	0xxx xxxx	dummy (ignored if received)		
00 08	0aaa aaaa	OUTPUT LEVEL	0 - 100	
00 09	0000 aaaa	PANPOT	0 - 14 (R - L)	*4-2-1
00 0A	0xxx xxxx	dummy (ignored if received)		
:	:	:		
00 0F	0xxx xxxx	dummy (ignored if received)		
Total size		00 00 10		

*4-2-1 This parameter ignored in Rhythm Part.

*4-3 Rhythm part setup area

Offset address	Description	
00 00 00	Rhythm Setup (for Key# 24)	*4-3-1
00 00 04	Rhythm Setup (for Key# 25)	
00 00 08	Rhythm Setup (for Key# 26)	
00 00 0C	Rhythm Setup (for Key# 27)	
00 00 10	Rhythm Setup (for Key# 28)	
:	:	
:	:	
:	:	
00 02 4C	Rhythm Setup (for Key# 107)	
00 02 50	Rhythm Setup (for Key# 108)	

*4-3-1 Rhythm setup (for each Key #)

Offset address		Description		
00 00	0aaa aaaa	TIMBRE	0 - 127 (101-164, r01-r63)	
00 01	0aaa aaaa	OUTPUT LEVEL	0 - 100	
00 02	0000 aaaa	PANPOT	0 - 14 (R - L)	
00 03	0000 000a	REVERB SWITCH	0 - 1 (OFF, ON)	
Total size		00 00 04		

*4-4 Patch memory

Offset address		Description		
00 00	0000 00aa	TIMBRE GROUP	0 - 3 (a, b, i, r)	
00 01	00aa aaaa	TIMBRE NUMBER	0 - 63	
00 02	00aa aaaa	KEY SHIFT	0 - 48 (-24 - +24)	
00 03	0aaa aaaa	FINE TUNE	0 - 100 (-50 - +50)	
00 04	000a aaaa	BENDER RANGE	0 - 24	
00 05	0000 00aa	ASSIGN MODE	0 - 3 (POLY 1, POLY 2, POLY 3, POLY 4)	
00 06	0000 000a	REVERB SWITCH	0 - 1 (OFF, ON)	
00 07	0xxx xxxx	dummy		
Total size		00 00 08		

*4-5 System area

The total munber of Partial reserves for 9 parts must be 32 or less.
All Partial reserves must be sent as a package of 9 parts.

Offset address		Description		
00 00	0aaa aaaa	MASTER TUNE	0 - 127 (427.5Hz - 452.6Hz)	
00 01	0000 00aa	REVERB MODE	0 - 3 (Room, Hall, Plate, Tap delay)	
00 02	0000 0aaa	REVERB TIME	0 - 7 (1 - 8)	
00 03	0000 0aaa	REVERB LEVEL	0 - 7	
00 04	00aa aaaa	PARTIAL RESERVE (Part 1)	0 - 32	
00 05	00aa aaaa	PARTIAL RESERVE (Part 2)	0 - 32	
00 06	00aa aaaa	PARTIAL RESERVE (Part 3)	0 - 32	
00 07	00aa aaaa	PARTIAL RESERVE (Part 4)	0 - 32	
00 08	00aa aaaa	PARTIAL RESERVE (Part 5)	0 - 32	
00 09	00aa aaaa	PARTIAL RESERVE (Part 6)	0 - 32	
00 0A	00aa aaaa	PARTIAL RESERVE (Part 7)	0 - 32	
00 0B	00aa aaaa	PARTIAL RESERVE (Part 8)	0 - 32	
00 0C	00aa aaaa	PARTIAL RESERVE (Part R)	0 - 32	
00 0D	000a aaaa	MIDI CHANNEL(Part 1)	0 - 16 (1 - 16, OFF)	
00 0E	000a aaaa	MIDI CHANNEL(Part 2)	0 - 16 (1 - 16, OFF)	
00 0F	000a aaaa	MIDI CHANNEL(Part 3)	0 - 16 (1 - 16, OFF)	
00 10	000a aaaa	MIDI CHANNEL(Part 4)	0 - 16 (1 - 16, OFF)	
00 11	000a aaaa	MIDI CHANNEL(Part 5)	0 - 16 (1 - 16, OFF)	
00 12	000a aaaa	MIDI CHANNEL(Part 6)	0 - 16 (1 - 16, OFF)	
00 13	000a aaaa	MIDI CHANNEL(Part 7)	0 - 16 (1 - 16, OFF)	
00 14	000a aaaa	MIDI CHANNEL(Part 8)	0 - 16 (1 - 16, OFF)	
00 15	000a aaaa	MIDI CHANNEL(Part R)	0 - 16 (1 - 16, OFF)	
00 16	0aaa aaaa	MASTER VOLUME	0 - 100	
Total size		00 00 17		

Example of DT1 application - - - 1
Set Partial reserve of each part as follows by sending the byte string listed below.

Part 1 ..... 8 Parts 3 thru 8 0
Part 2 ..... 10 Rhythm part 8

F0 41 10 16 12 10 00 04 08 0A 00 00 00 00 00 00 08 52 F7

*4 - 6 Write Request

This message simulates write switch on LAPC - I, that is, LAPC - I writes data of each part in the temporary area into internal memory.
(Memory must be specified by two bytes addresses.)

Offset address	Description		
00 00	00aa aaaa	Timbre Write (part 1)	0 - 63 (01 - 64)
00 01	0000 0000		0 (Internal)
00 02	00aa aaaa	Timbre Write (part 2)	
00 03	0000 0000		
:	:	:	
:	:	:	
00 0E	00aa aaaa	Timbre Write (part 8)	
00 0F	0000 0000		
01 00	0aaa aaaa	Patch Write (part 1)	0 - 127 (1 - 128)
01 01	0000 0000		0 (Internal)
01 02	0aaa aaaa	Patch Write (part 2)	
01 03	0000 0000		
:	:	:	
:	:	:	
01 0E	0aaa aaaa	Patch Write (part 8)	
01 0F	0000 0000		
10 00	0000 00aa	Result	0 - 3
			0 = Function Completed
			1 = Incorrect Mode
			2 = Incorrect Mode
			3 = Incorrect Mode

Example of DT1 application - - - 2

Direct LAPC - I to write data of Part 3 in the temporary area into #76 by sending the byte string listed below.

F0 41 10 16 12 40 01 04 4B 00 70 F7

*4 - 7 All Parameters Reset

All parameters will be initialized by sending data to this address.

Address Map

Address	Block	Sub Block	Reference
02 00 00	Timbre Temp. (Basic Ch)	Common	4-1-1
		Partial 1	4-1-2
		Partial 2	
		Partial 3	
		Partial 4	
03 00 00	Patch Temp. (Unit#)	Part 1	4-2
		Part 2	
		:	
		Part 8	
		Part R	
03 01 10	Rhythm Setup Temp(Unit#)	Note# 24	4-3-1
		Note# 25	
		:	
		Note# 107	
		Note# 108	
04 00 00	Timbre Temp. (Unit#)	Part 1	4-1
		Part 2	
		:	
		Part 7	
		Part 8	
05 00 00	Patch Memory	# 1	4-4
		# 2	
		:	
		#127	
		#128	
08 00 00	Timbre Memory	# 1	4-1
		# 2	
		:	
		# 63	
		# 64	
10 00 00	System Area		4-5
40 00 00	Write Request		4-6
7F xx xx	All Parameters Reset		4-7

LA SOUND CARD (Tone Generation System Part) Date : Mar. 30. 1989

Model LAPC – I

MIDI Implementation Chart

Version : 1.00

Function •••		Transmitted	Recognized	Remarks
Basic	Default	×	2 – 10	
Channel	Changed	×	×	
Mode	Default	×	3	
	Messages	×	×	
	Alterd	*********	×	
Note Number		×	0 – 127	
	True Voice	*********	12 – 108	
Velocity	Note ON	×	○ v = 1 – 127	
	Note OFF	×	×	
After Touch	Key's	×	×	
	Ch's	×	×	
Pitch Bender		×	○	
Control Change	1	×	○	Modulation
	2 – 5	×	×	
	6	×	*	Data Entry
	7	×	○	Volume
	8, 9	×	×	
	10	×	○	Pan
	11	×	○	Expression
	12 – 63	×	×	
	64	×	○	Hold 1
	65 – 99	×	×	
	100,101	×	* (0)	RPN LSB, MSB
	102 – 120	×	×	
	121	×	○	Resets All Controllers
Prog Change		×	○ 0 – 127	
	True #	*********	0 – 127	
System Exclusive		×	○	
System Common	Song Pos	×	×	
	Song Sel	×	×	
	Tune	×	×	
System Real Time	Clock	×	×	
	Commands	×	×	
Aux Messages	Local ON/OFF	×	×	
	All Notes OFF	×	○ (123 – 127)	
	Active Sense	×	×	
	Reset	×	×	

Notes

* RPN = Registered Parameter Number
RPN # 0 : Pitch Bend Sensitivity
The value of parameter is to be determined by entering data.

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No

SOUND LIST

Prog-No.	Used Partial
Timbre name	

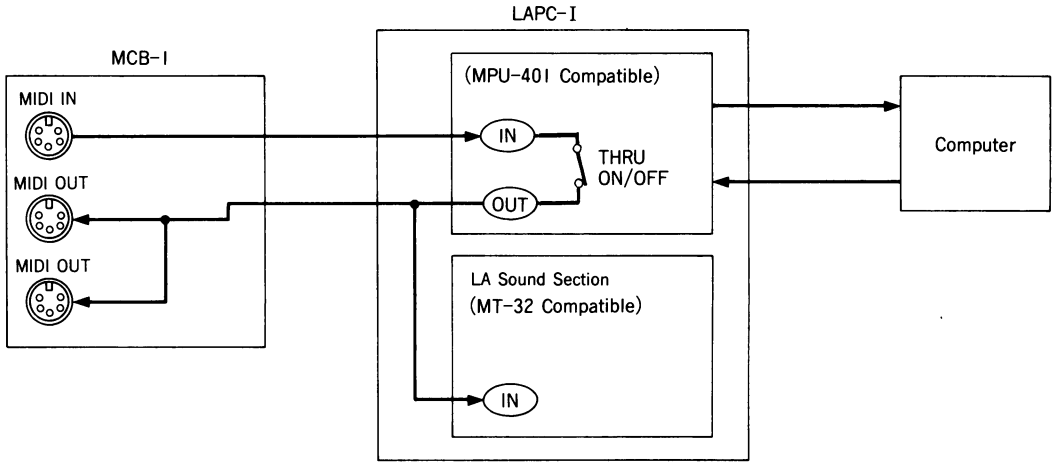
PIANO							
001 4 Acou Piano 1	002 2 Acou Piano 2	003 1 Acou Piano 3	004 3 Elec Piano 1	005 2 Elec Piano 2	006 2 Elec Piano 3	007 4 Elec Piano 4	008 3 Honkytonk
ORGAN							
009 3 Elec Org 1	010 3 Elec Org 2	011 2 Elec Org 3	012 2 Elec Org 4	013 3 Pipe Org 1	014 3 Pipe Org 2	015 2 Pipe Org 3	016 2 Accordion
KEYBRD							
017 4 Harpsi 1	018 2 Harpsi 2	019 1 Harpsi 3	020 3 Clavi 1	021 2 Clavi 2	022 1 Clavi 3	023 4 Celesta 1	024 2 Celesta 2
S-BRASS				**SYNBASS**			
025 2 Syn Brass 1	026 3 Syn Brass 2	027 2 Syn Brass 3	028 2 Syn Brass 4	029 2 Syn Bass 1	030 2 Syn Bass 2	031 2 Syn Bass 3	032 1 Syn Bass 4
SYNTH 1							
033 3 Fantasy	034 3 Harmo Pan	035 3 Chorale	036 2 Glasses	037 4 Soundtrack	038 4 Atmosphere	039 4 Warm Bell	040 1 Funny Vox
SYNTH 2							
041 3 Echo Bell	042 3 Ice Rain	043 2 Oboe 2001	044 2 Echo Pan	045 2 Doctor Solo	046 2 Schooldaze	047 1 Bellsinger	048 2 Square Wave
STRINGS							
049 4 Str Sect 1	050 3 Str Sect 2	051 2 Str Sect 3	052 3 Pizzicato	053 3 Violin 1	054 2 Violin 2	055 3 Cello 1	056 2 Cello 2
		GUITAR					
057 2 Contrabass	058 3 Harp 1	059 2 Harp 2	060 2 Guitar 1	061 2 Guitar 2	062 4 Elec Gtr 1	063 3 Elec Gtr 2	064 4 Sitar

■ *SOUND LIST*

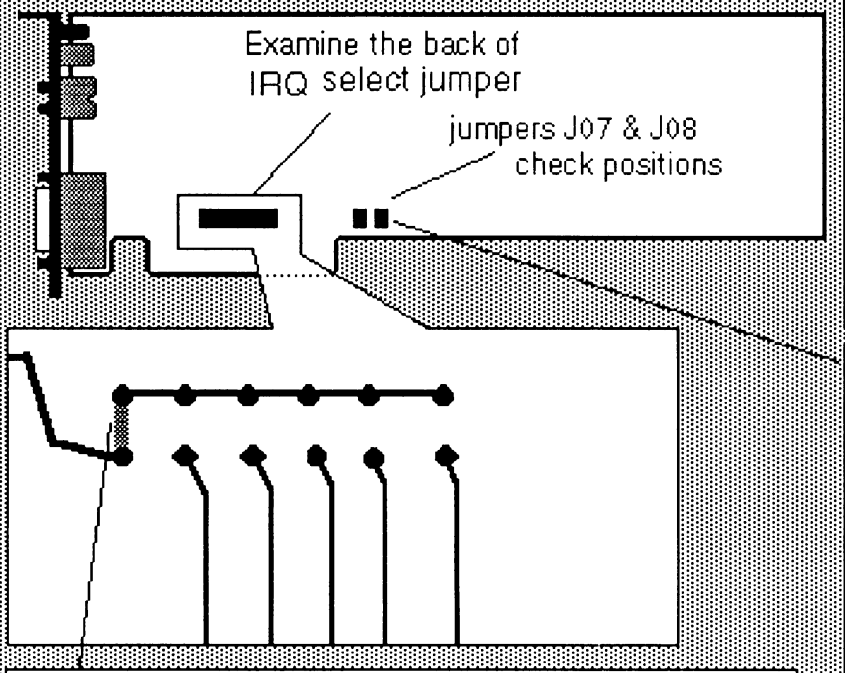
Prog-No.	Used Partial
Timbre name	

BASS							
065 2 Acou Bass 1	066 1 Acou Bass 2	067 2 Elec Bass 1	068 1 Elec Bass 2	069 3 Slap Bass 1	070 2 Slap Bass 2	071 4 Fretless 1	072 2 Fretless 2
WIND 1						**WIND 2**	
073 4 Flute 1	074 2 Flute 2	075 3 Piccolo 1	076 2 Piccolo 2	077 2 Recorder	078 3 Pan Pipes	079 4 Sax 1	080 3 Sax 2
081 2 Sax 3	082 1 Sax 4	083 3 Clarinet 1	084 2 Clarinet 2	085 2 Oboe	086 2 Engl Horn	087 2 Bassoon	088 2 Harmonica
BRASS							
089 3 Trumpet 1	090 2 Trumpet 2	091 3 Trombone 1	092 2 Trombone 2	093 3 Fr Horn 1	094 2 Fr Horn 2	095 2 Tuba	096 4 Brs Sect 1
	MALLET						
097 3 Brs Sect 2	098 3 Vibe 1	099 2 Vibe 2	100 1 Syn Mallet	101 3 Windbell	102 2 Glock	103 4 Tube Bell	104 1 Xylophone
	SPECIAL						
105 3 Marimba	106 2 Koto	107 4 Sho	108 4 Shakuhachi	109 2 Whistle 1	110 1 Whistle 2	111 4 Bottleblow	112 3 Breathpipe
PERCUSN							
113 2 Timpani	114 1 Melodic Tom	115 2 Deep Snare	116 2 Elec Perc 1	117 2 Elec Perc 2	118 3 Taiko	119 1 Taiko Rim	120 2 Cymbal
		EFFECTS					
121 2 Castanets	122 2 Triangle	123 4 Orche Hit	124 1 Telephone	125 1 Bird Tweet	126 4 One Note Jam	127 3 Water Bells	128 4 Jungle Tune

■*BLOCK DIAGRAM*



BACK (CIRCUIT SIDE) OF LAPC-1 MIDI CARD



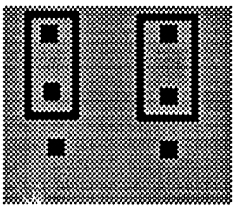
If any of the pins are bridged by copper substrate, you CANNOT change IRQ from the pin that is shunted. The cards that were shipped with this defect all default to IRQ2. If your card has this problem, sever any copper between upper and lower pins ONLY. Leave top row connected as above!

Note: IRQ select jumpers are mis-painted on some cards. IRQ marked "4" may be 3, 5 may be 4, etc. The only way to be sure is to try jumpers to either side of "correct" number if card is malfunctioning with software or other hardware.

Drawn by Todd Henschell. Note: I am not responsible for any damage to your card that may occur if you implement this repair. It is based on current (4-91) data and may change.

Correct positions of these jumpers should be:

j07 j08



Roland technical support is aware of this problem. Keep in mind your card may have another problem and this repair may NOT solve that difficulty. Numerous cards have been shipped with this defect, according to Roland.

If any program using IRQ-driving communications with the LAPC-1 either fails to function, or you get system lockups when trying to change the IRQ selection on your LAPC card, you may have a card with this known defect. The solution is simple: if the copper bridges any of the selection jumpers (like gray area above) use an X-acto blade and carefully cut the connection and peel the copper free. Resolder the pins as a safety precaution.